



SMART TROLLEY AUTOMATED SHOPPING CART WITH REMOTE BILLING SYSTEM

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ABSTRACT

Today purchasing various items in malls or supermarkets require a trolley. Product procurement represents a complex process. On each occasion customer has to pull the trolley from rack to rack for collecting items and simultaneously customer has to perform estimated expense computation. At the end, customer has to wait in queue for billing and payment. To overcome that we have been developed a smart way for shopping. Each and every product has RFID tag instead of barcode scanner. The smart trolley will consists of a RFID reader, LCD display and bluetooth. When a person puts any product in the trolley it will scan the product and the cost and the name of the product will be displayed. The sum total cost of all the products will be added to the final bill, which will be stored in the microcontroller memory. It will wirelessly transfer the product information of the items placed in the trolley to the main computer. So, to avoid waiting in billing queue while constantly thinking about the budget, a new concept has been introduced which is the "SMART TROLLEY".

KEYWORDS: RFID reader, LCD display, Bluetooth.

I. INTRODUCTION

The idea is to provide every customer entering the mall a trolley equipped with combination of a display device and unit consist of RFID tag reader connected together through Bluetooth. Same display device will be connected remotely to billing server over wireless network. Portable device will enable customer to manage his/her shopping list, avail an available offer and to some extent it will even help customer to navigate through shopping process. But the striking feature of this project is that customer don't have to go through the hectic process of attending queue for billing his/her entire shopping with properly managed process by following all secure system protocols subsequently.

II. BASIC CONCEPT

RFID is a generic term for technology that use radio wave to automatically identify individuals item. RFID is technology that allows data transfer between tags and reader without the necessary of light over a distance of up to couple of 10 meters depending on the type of tag used. Information is being transferred via radio wave and multiple tags can written and read at same time.

There are different kind of system existent for Auto ID system. In terms of application, cost requirement and functional demands, one of mix of solutions are adopted to fulfil the auto ID functionality and information collection in the applied system and they even can integrate high-end technologies which greatly improves the information visibility in the system information flow. Barcode is a binary code comprising a field of bars and gaps that are arranged in parallel. They are arranged according to predetermined pattern and represent data elements that refer to associated symbol. The sequence made up of wide and narrow bars and gaps can be interpreted numerically and alphanumerically.

The most popular barcode is the EAN (European Article number) code, which was designed specifically to fulfil the requirements of the grocery industry in 1976.

Trolley will be enlaced with an user friendly display device running an application which will help customer to manage shopping list. All the systems will be connected over wireless communication such as Wi-Fi, Bluetooth.

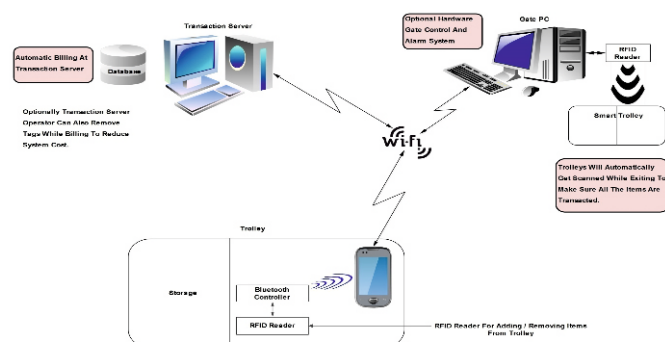


Fig. 1 working of smart trolley automated shopping cart

III. MATHEMATICAL MODEL

Mathematical model for the propose system would be as follow:

Set Theory :

Let S (be a main set of) $\equiv \{SDB, LDB, C, A, S, TR, AO\}$

where, SDB is the copy of the server database. This database is responsible for storing user information related to cloud interactions. (Elaborate..)

LDB is a set of local database that a user owns. It consists of data tables having data items related to the products and their sales transactions. (Elaborate..)

C is a set of all clients using the server database and mining services from the server. And $(c_1, c_2, c_3, \dots, c_n) \in C$. (elaborate..)

A is a set of algorithms applied on the input data to get mining results. (Elaborate..)

S is the server component of the system. The server is responsible for registering, authenticating and providing associations to the end user. (Elaborate..)

TR is a set of transaction rules that are applied on the input dataset provided by the client from his LDB. And $(tr_1, tr_2, tr_3, \dots, tr_n) \in TR$

AO is a set of associations that are extracted from the input and a form the output of the system. (Elaborate..)

Functionalities:

$SDB' = \text{Register User (uid, password, fullname, address, country, contact, email);}$

$\text{password} = \text{SHA1(input_password);}$

$U = \text{Authenticate User (uid, password, SDB');}$

$LDB1 = \text{Manage Products (pid, product name, cost);}$

$LDB2 = \text{Manage Billing (transactions, items);}$

$LDB = LDB1 + LDB2$

$TP(\text{Transaction Process}) = \text{Scan Product(LDB2, Transmit info to transaction server(TP));}$

$UPLOAD(TP);$

$AO = \text{Apply Transaction(TP);}$

$\text{Results} = \text{Feed Info To Smart Device(Download(AO));}$

IV. CONCLUSION

System that is to be implemented will result in saving the valuable time of customer. This will help to ease the hectic and time consuming process of attending

queue. As whole system is remotely connected to each component of shopping and billing process user don't need to bother more about managing his/her shopping list. Business server application will automatically handle the billing process and will remotely inform customer with detailed information about the shopping done. As remote billing system is implemented to avoid any kind of unwanted events of shop lifting or theft, there will be a security system implemented at each exit point of mall which can identify whether customer has paid for the shopping. If billing payment is paid the it will allow the customer to exit the mall. Main disadvantage is that as the system is interdependent if one of the component fail to work hen other system may come to halt.

REFERENCES

- [1] Y. J. Zuo "Survivable RFID systems: Issues, challenges, and techniques", IEEE Trans. Syst., Man, Cybern. C, Appl. Rev., vol. 40, no. 4, pp.406 -418 2010
- [2] F. Gandino , B. Montrucchio , M. Rebaudengo and E. R. Sanchez "On improving automation by integrating RFID in the traceability management of the agri-food sector", IEEE Trans. Ind. Electron., vol. 56, no. 7, pp.2357 -2365 2009 ,
- [3] T. M. Choi "Coordination and risk analysis of VMI supply chains with RFID technology", IEEE Trans Ind. Informat., vol. 7, no. 3, pp.497 -504 2011
- [4] J. D. Porter and D. S. Kim "An RFID-enabled road pricing system for transportation", IEEE Syst. J., vol. 2, no. 2, pp.248 -257 2008
- [5] H. H. Bi and D. K. Lin "RFID-enabled discovery of supply networks", IEEE Trans. Eng. Manag., vol. 56, no. 1, pp.129 -141 2009
- [6] K. Finkenzeller RFID Handbook: Fundamentals and Applications in Contactless Smart Cards and Identification, 2003 :Wiley
- [7] J. Z. Gao , L. Prakash and R. Jagatesan "Understanding 2D-BarCode technology and application in M-commerce-design and implementation of a 2D barcode processing solution", Proc. Comput. Softw. Appl. Conf., pp.49 -56 2007 [8] D. Hahnel , W. Burgard , D. Fox , K. Fishkin and M. Philipose "Mapping and localization with RFID technology", Proc. IEEE Int. Conf Robot. Autom., pp.1015 -1020 2004
- [9] J. Y. Zhou , J. Shi and X. L. Qiu "Landmark placement for wireless localization in rectangular-shaped industrial facilities", IEEE Trans. Veh. Technol., vol. 59, no. 6, pp.3081 -3090 2010
- [10] S. S. Saad and Z. S. Nakad "A standalone RFID indoor positioning system using passive tags", IEEE Trans. Ind. Electron., vol. 58, no. 5, pp.1961 -1970 2011
- [11] Khalifa, O, Islam, MDR and Khan, S, "Cyclic redundancy encoder for error detection in communication channels", RF and Microwave Conference, 2004